cells, renal epithelial cells, but no casts. No leptospirae could be found on dark-ground examination, but the urine was examined after some delay.

Serum for agglutination against *Leptospira icterohaemorrhagiae* was sent to the Reference Laboratory at Oxford. The result showed a positive agglutination in a dilution of 1/400; the reaction was a partial agglutination, atypical microscopically.

The necropsy was performed twenty-two hours after death; the report was as follows (Dr. Susman):

Lungs: scattered haemorrhages in both pleurae; both lungs distended with fluid; many haemorrhages throughout. **Stomach:** scattered haemorrhages over the mucosa; massive haemorrhage involving five to six feet (1.5-1.8 metres) of the terminal ileum. **Liver:** enlarged; yellow colour throughout; no macroscopic necrosis; biliary pathway normal. **Spleen:** enlarged; brick-red colour. **Adrenals:** bilateral enlargement; complete disorganization by extensive haemorrhages. **Kidney:** abundant pelvic haemorrhages; fresh fatty degeneration.

Histological Findings.—**Liver:**—There were dissociation and loosening of the hepatic cells, scattered areas of fatty degeneration, and areas of hepatic regeneration with enlarged and binucleated liver cells. No leptospirae could be found on sections stained by the Levaditi technique. **Kidney:**—There were a few hyalinized glomeruli, some tubular necrosis, scattered foci of polymorph and lymphocytic infiltration, and many dilated blood vessels. Sudan IV section failed to reveal fatty degeneration, but sections stained by the Levaditi technique showed many leptospirae, particularly around the tubules.

The finding of spirochaetes in the kidney but not in the liver, and the rarity of the organisms in the liver, were commented upon by Ashe *et al.* (1941).

Discussion

The clinical history of a febrile disturbance followed by severe renal and hepatic failure accompanied by a haemorrhagic rash, associated with the laboratory and necropsy findings, proves the diagnosis of Weil's disease. The hepatic and renal failure noted in this case has been the subject of previous comment. Ashe *et al.* (1941) speak of a hepato-renal syndrome in the disease; Walch-Sorgdrager (1939) refers to the frequent misdiagnosis of acute yellow atrophy; and Davidson *et al.* (1934) consider the association of jaundice and nephritis of great diagnostic value. The presence of an atypical agglutination of 1/400 against leptospirae is probably explained by the fact that the reaction was performed early in the disease, and in those cases terminating fatally the development of antibodies may be delayed.

This case, with severe peripheral collapse, cold extremities, a low blood pressure, and profuse sweating, resembled clinically the acute adrenal apoplexy of the Waterhouse-Friedrichsen syndrome. That syndrome occurs classically in meningococcal meningitis or meningococcal septicaemia, and, so far as we know, this clinical picture has not been reported in Weil's disease, though bilateral adrenal haemorrhages are a common necropsy finding (Ashe *et al.*, 1941).

Gardner and Wylie (1946) found that 3.3% of their 182 cases were in butchers, but did not specify the actual work done by these men. Our case is interesting in that it occurred sporadically in a butcher who did not frequent slaughterhouses or kill his own cattle. A case has been reported in which the infection was derived from meat that had been contaminated by rat urine, and the disease is a known hazard of slaughtermen (Walch-Sorgdrager, 1939).

In order to pursue the epidemiological aspects further, two rats were obtained from behind the patient's home and close to a small stream. On post-mortem examination they were normal, but leptospirae were seen in the kidney on sectioning and staining by the Levaditi technique. The kidneys of the rats were ground up and injected into guinea-pigs, and the latter died on the ninth and tenth days, presenting at necropsy the typical appearances of Weil's disease. They showed jaundice, haemorrhages into the lungs (butterfly appearance), kidneys, and adrenals, and on section the kidneys, liver, spleen, adrenals, and lungs contained numerous spirochaetes. Weil's disease, which is mild and asymptomatic in rats, has an incidence of between 10 and 30% in wild rats in this country, and it is highly probable that infection in the present case was derived from the local rat population.

The death rate in Weil's disease has been variously put between 4 and 48% (Walch-Sorgdrager, 1939; Wood, 1943),

but as more of the milder cases come to be diagnosed it is probable the death rate will fall. It is interesting that most of those who die from the disease have severe renal failure, with associated uraemia and oliguria (Wood, 1943; Hutchison *et al.*, 1946), and the case presented here was no exception to this rule.

Summary

A case of Weil's disease occurring sporadically in a butcher and presenting the clinical signs of acute adrenal insufficiency is described. The importance of considering Weil's disease in the differential diagnosis of jaundice and nephritis is stressed.

We acknowledge our gratitude to Dr. W. Brockbank for permission to publish a report of this case.

REFERENCES

- Ashe, W. F., Pratt-Thomas, H. R., and Kumpe, C. W. (1941). *Medicine*, Baltimore, 20, 145.
Davidson, L. S. P., Campbell, R. M., Rae, H. J., and Smith, J. (1934). *British Medical Journal*, 2, 1137.
Gardner, A. D., and Wylie, J. A. H. (1946). *Lancet*, 1, 955.
Hutchison, J. H., Pippard, J. S., Gleeson-White, M. H., and Sheehan, H. L. (1946). *British Medical Journal*, 1, 81.
Walch-Sorgdrager, B. (1939). *Bull. Hlth. Org. L.o.N.*, 8, 143.
Wood, W. B. (1943). In Cecil's *Text Book of Medicine*, 6th ed., p. 366, Philadelphia.

GRAVITY DRAINAGE IN THE PRONE POSITION IN TREATMENT OF DIGESTIVE FISTULAE OF THE ABDOMINAL WALL

BY

DAVID H. PATEY, M.S., F.R.C.S.
J. H. L. FERGUSON, M.B.E., M.B., B.Ch.

AND

M. D. EXLEY, S.R.N.
(From the Wards of the Middlesex Hospital)

A fistula of the abdominal wall which communicates internally with a segment of the alimentary canal rich in digestive juices (e.g., duodenum, jejunum, ileum, and to a lesser extent caecum), or with a digestive gland (e.g., pancreas), may constitute a sore trial to the patient and a test to medical and nursing attendants. The special feature of these cases is the digestion of the skin which occurs around the fistula, often to a considerable distance. When the discharge is abundant it may flow round to the back and down to the groin and crutch, so that areas of skin outside the abdominal wall may also be digested. The raw digested skin is extremely painful and sensitive, and a patient with an extensive digestive fistula is usually miserable and his appetite and sleep are upset. From these causes alone, quite apart from any nutritional loss from the fistula, his general condition may progressively deteriorate, and a vicious circle be set up that may preclude the direct surgical attack which alone can cure the fistula. Minor digestive fistulae may lend themselves to treatment by the application of protective or neutralizing pastes and ointments to the abdominal wall: a rather more severe fistula may be successfully treated by some suction method of removing the digestive juices as they exude; but for a real pouring digestive fistula all these methods usually fail.

We have successfully treated a number of cases of this type during the past few years by gravity drainage in the prone position. As this method of treatment of digestive fistulae does not seem to be widely known, we have thought it worth while to record the method, together with some practical points of importance and a review of four cases.

Case I

The first case was the most dramatic, and it was in this one that the method was worked out. It was that of a schoolboy, aged 15, who was admitted on March 7, 1943, from another hospital to the care of Surg. Rear-Admiral Sir Gordon Gordon-Taylor. Three months previously his gangrenous appendix had been removed. Small-gut obstruction and pelvic abscess formation had followed, for which ileostomy was performed. Subsequent attempted closure failed, and a further laparotomy revealed sloughing of coils of small gut which later formed three other spontaneous jejunal fistulae. His condition when first seen was extremely bad. He was distressingly emaciated (weight, 5 st. 3 lb.=33.1 kg.), while on to his abdominal wall, raw and semi-digested from costal margin to pubis,

quantities of fluid and semi-solid intestinal contents discharged, and the mere approach of a medical attendant caused screams of apprehension. At the same time the boy was ravenously hungry, as meals were erupted together with succus entericus on to his abdomen within half an hour of ingestion. During the two days following admission a variety of nursing methods applicable to intestinal fistulae were unsuccessfully adopted. Protective pastes would not adhere to the abdominal wall, oiled-silk sheeting failed to maintain watertight connexion with the indrawn mouths of the fistulae, while mechanical suction was subject to obstruction from semi-solid matter and prolapsed intestine and was unable to cope with sudden peristaltic rushes. Local percaïne application did, however, alleviate his pain. Meanwhile a large sacral sore was also causing much distress, and the decision was taken to nurse the patient in the prone position on slings in the hope that the sore would be given an opportunity to heal, and that simultaneously the intestinal contents would discharge downwards from the stomata without further irritation and digestion of the parietes.

Although the success of this measure was immediately evident, the uneven weight distribution with the slings proved uncomfortable to the patient's back. The carpenter then made a special wooden frame. But finally the method described and illustrated was evolved and the boy lay in the prone position day and night almost without interruption for nearly three months.

The improvement of his condition was striking. Six pounds (2.7 kg.) in weight was gained in six days. The abdominal wall began to heal, and it was interesting to note that the intestine prolapsing through hitherto recessed openings formed valves which assisted in slowing the intestinal emptying time, thus aiding nutrition, and occasional rectal motions were achieved. By June 3 his weight was 6 st. 7 lb. (41.28 kg.). Operation, consisting of multiple resection and anastomosis, was possible, and with saline, glucose, plasma, blood, and sulphamezathine preparation this was successfully performed by Sir Gordon Gordon-Taylor. When last seen in February, 1944, the boy was in excellent health and spirits.

Case II

This patient was a man aged 49 on whom laparotomy had been performed with a view to resection of a gastric ulcer. Owing to the size, difficult access, and adhesions it was decided to do a jejunostomy instead, by cutting across the jejunum and making an anastomosis in Y, bringing the cut distal end out through the abdominal wall. Owing to the extreme regurgitation of digestive juices the jejunostomy was not a technical success. The abdominal wall, groins, and back became very raw. The patient was nursed in the prone position, when the condition of the abdominal wall at once improved and it was found possible to maintain the jejunostomy feeding for nearly five months. It was then operated on uneventfully and closed.

Case III

This man, aged 25, had a terminal ileostomy performed in May, 1943, for acute ulcerative colitis with haemorrhage which had failed to respond to medical treatment. The abdominal wall became badly digested from the discharges from the ileostomy. Treatment in the prone position rapidly cleared up the condition of the abdominal wall. The patient died in November, 1943, after operation for intestinal obstruction, but the condition of the abdominal wall had in the meantime been satisfactorily controlled by nursing in the prone position.

Case IV

This patient, a man aged 34, also suffered from ulcerative colitis which had failed to respond to medical treatment. Terminal ileostomy was performed in June, 1945, and again there was much digestion of the abdominal wall by the small-intestine discharges. Treatment in the prone position was successfully adopted, and was carried out with intervals over several months. At the end of this time the ileostomy discharge was semi-solid and much less irritating. Subsequently total colectomy was successfully performed. In this case the prone position did lead to a moderate prolapse of the ileostomy, up to about 6 in. (15 cm.) protruding, but this went back when he was able to resume the supine position.

Some Practical Points

The accompanying illustration shows the arrangement of the bed and mattresses that was found to be the simplest and most efficient. The mattress at the head of the bed is the top third of a divided mattress, and that at the bottom an ordinary mattress folded as illustrated so that the dorsa of the feet are comfortably supported. A flat tray can thus be introduced between the two mattresses to catch the discharges. In addition pillows may be arranged round the division in the mattresses to suit the comfort of the patient. He may lie in this position continuously day and night as the first case did, or may be turned back for intervals of rest. The worse the state of the

abdominal wall the less he feels the inconvenience of the abnormal position in the relief it affords. In a total intestinal fistula the bowels present no problem. In a partial intestinal fistula the patient is turned when he wishes to open his bowels. The prone position with divided mattress lends itself without difficulty to the passage of urine in the male (it so happened

Diagram showing arrangement of bed and mattresses.

that all our patients have been males), and it should not be difficult to make suitable nursing arrangements in the female. Meals can readily be taken prone if the food is first cut up and the pillows are adjusted, the patient supporting himself on one arm and using a spoon with the other hand. Reading can be managed with a book-rest. It is best to turn the head end of the bed to the centre of the ward so that the patient sees the activities of the ward and not merely the wall.

A CASE OF CEREBRAL MALARIA IN GREAT BRITAIN

BY

J. B. RYDER, M.R.C.P.I.

AND

R. T. TOWSON, M.D.

Assistant Medical Officers, South Shields General Hospital

Cerebral malaria as a cause of coma is rare in Great Britain. A search of the literature has revealed only two cases in recent years (Minett and Bernfield, 1937; Sneddon, 1943), in spite of the fact that one would have expected to encounter further cases in Service personnel returning from malarious areas, especially in those repatriated by air. The following case is reported in order to emphasize two important aspects of the condition: first, that it may have to be considered as a cause of coma in this country, and, secondly, because early treatment is so essential.

Case Report

A steward in the Merchant Navy aged 26 was admitted in coma to the South Shields General Hospital at 1.30 p.m. on Sept. 8, 1946. The history, elicited from his wife, was as follows: Four days previously he had arrived in port from West Africa, having been ten days at sea. On reaching home the same day he had complained of headache and of feeling hot and shivery. He had a frequent unproductive cough and vomited after food. During the three succeeding days he had several brief severe shivering attacks and the vomiting persisted. His doctor at first treated him for influenza, but when he suddenly became unconscious, at noon on the fourth day, straightway sent him into hospital with a provisional diagnosis of malaria. A previous history of an attack of malaria three years before, with no subsequent relapses, was also obtained from his wife, and later confirmed by the patient himself.

On examination he was seen to be a man of average physique. He was in a restless, lightly comatose state, but responded to simple shouted orders and reacted to painful stimuli. He was unable to speak and was incontinent of urine. The temperature was 101.2° F. (38.4° C.), pulse 100, and respirations 28. His skin was dry and hot; no abnormality was found in the cardiovascular system and lungs. The abdomen exhibited moderate muscular resistance in the left hypochondrium, but neither liver nor spleen was palpable. Examination of the C.N.S. showed regular and equal pupils with a sluggish reaction to light; no abnormality in the fundi; normal muscle tone, no paralysis; general absence of tendon reflexes, with